

Biological Assessment for
Terrestrial Species Managed by the U.S. Fish and Wildlife Service
West False River Salinity Barrier Geologic Exploration



Prepared for:



California Department of Water Resources

AECOM

September 2015

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ACRONYMS AND ABBREVIATIONS

CDFW	California Department of Fish and Wildlife
CNDDDB	California Natural Diversity Database
CPT	Cone Penetrometer Test
Delta	Sacramento-San Joaquin River Delta
DWR	Department of Water Resources
EDB	Emergency Drought Barrier Project
ESA	Endangered Species Act
HMMP	Hazardous Materials Management Program
HSA	hollow stem auger
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
WFRSB	West False River Salinity Barrier Project

1 INTRODUCTION

Faced with potentially insufficient water supplies to repel salinity in the Sacramento-San Joaquin River Delta (Delta), the California Department of Water Resources (DWR) installed an emergency, temporary rock barrier across West False River in May-July 2015. The barrier is scheduled to be removed by November 15, 2015. The Emergency Drought Barrier Project (EDB) is essentially a pile of basketball-size rocks across the 800-foot-wide channel. Keeping saltwater out of the central Delta is a priority, as a large portion of the state's freshwater supplies travels through this part of the Delta. The barrier helps prevent saltwater contamination of water supplies used by people who live in the Delta and in Contra Costa, Alameda, and Santa Clara counties, as well as the 25 million people who rely on the Delta-based federal and state water projects for at least some of their supplies.

DWR is currently proposing to conduct land-based and overwater geotechnical exploration to inform design of potential future EDB installation. Such exploration would reduce uncertainty associated with the underlying ground that supports the barrier, locate poor foundation soils like peat, and better estimate engineering design parameters. Because of the need to install the EDB as quickly as possible, DWR was unable to conduct geotechnical exploration before the emergency EDB installation. Therefore, DWR is proposing to conduct the geological exploration during or following EDB removal activities.

2 CONSULTATION HISTORY

Coordination with the U.S. Fish and Wildlife Service (USFWS) and other regulatory agencies regarding the EDB project has been ongoing since early 2014 when DWR developed the first proposal to implement the project. The proposed geotechnical exploration was described in several preliminary drafts of the biological assessment prepared in support of earlier versions of the EDB project. The EDB at West False River was eventually installed May-July 2015 as part of an emergency action, before any exploration was conducted. Therefore, geotechnical exploration is not part of the associated formal consultation related to the emergency action.

3 PURPOSE AND SCOPE OF THIS BIOLOGICAL ASSESSMENT

This biological assessment is intended to satisfy the Section 7 consultation requirements of the federal Endangered Species Act (ESA) for terrestrial species managed by the USFWS. Section 7 consultation for the proposed action is required because the U.S. Army Corps of Engineers (USACE) is anticipated to authorize geotechnical exploration under Clean Water Act Section 404 Nationwide Permit No. 6.

Appendix A includes a USFWS Species List that was generated in support of the EDB project consultation. This list covers the Jersey Island U.S. Geologic Survey quadrangle, in which the geotechnical exploration would be conducted, as well as the surrounding eight quadrangles (Antioch North, Antioch South, Birds Landing, Bouldin Island, Brentwood, Isleton, Rio Vista, and Woodward Island). This biological assessment describes effects potentially resulting from implementation of the geotechnical exploration on giant garter snake (*Thamnophis gigas*). Delta smelt (*Hypomesus transpacificus*) is separately addressed in a biological assessment prepared for aquatic species.

Many additional species included on the USFWS list generated for the nine quadrangles were evaluated for their potential to occur in the vicinity of the project site and potentially be affected by the proposed action. The following terrestrial species were eliminated from consideration in this biological assessment because the geotechnical exploration locations are outside of the current range of the species or field observations concluded there is no suitable habitat for the species at, or adjacent to, the locations:

- ▶ Lange's metalmark butterfly (*Apodemia mormo langei*)
- ▶ Conservancy fairy shrimp (*Branchinecta conservatio*)
- ▶ Longhorn fairy shrimp (*Branchinecta longiantenna*)
- ▶ Vernal pool fairy shrimp (*Branchinecta lynchi*)
- ▶ Delta green ground beetle (*Elaphrus viridis*)
- ▶ Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*)
- ▶ San Bruno elfin butterfly (*Incisalia mossii bayensis*)
- ▶ Vernal pool tadpole shrimp (*Lepidurus packardii*)
- ▶ California tiger salamander, central population (*Ambystoma californiense*)
- ▶ California red-legged frog (*Rana draytonii*)
- ▶ Alameda whipsnake (*Masticophis lateralis euryxanthus*)
- ▶ California clapper rail (*Rallus longirostris obsoletus*)
- ▶ California least tern (*Sterna antillarum browni*)
- ▶ Salt marsh harvest mouse (*Reithrodontomys raviventris*)
- ▶ San Joaquin kit fox (*Vulpes macrotis mutica*)
- ▶ Large-flowered fiddleneck (*Amsinckia grandiflora*)
- ▶ Soft bird's-beak (*Cordylanthus mollis* ssp. *mollis*)
- ▶ Contra Costa wallflower (*Erysimum capitatum* ssp. *angustatum*)
- ▶ Contra Costa goldfields (*Lasthenia conjugens*)
- ▶ Colusa grass (*Neostapfia colusana*)
- ▶ Antioch Dunes evening-primrose (*Oenothera deltoides* ssp. *howellii*)
- ▶ Keck's checker-mallow (*Sidalcea keckii*)

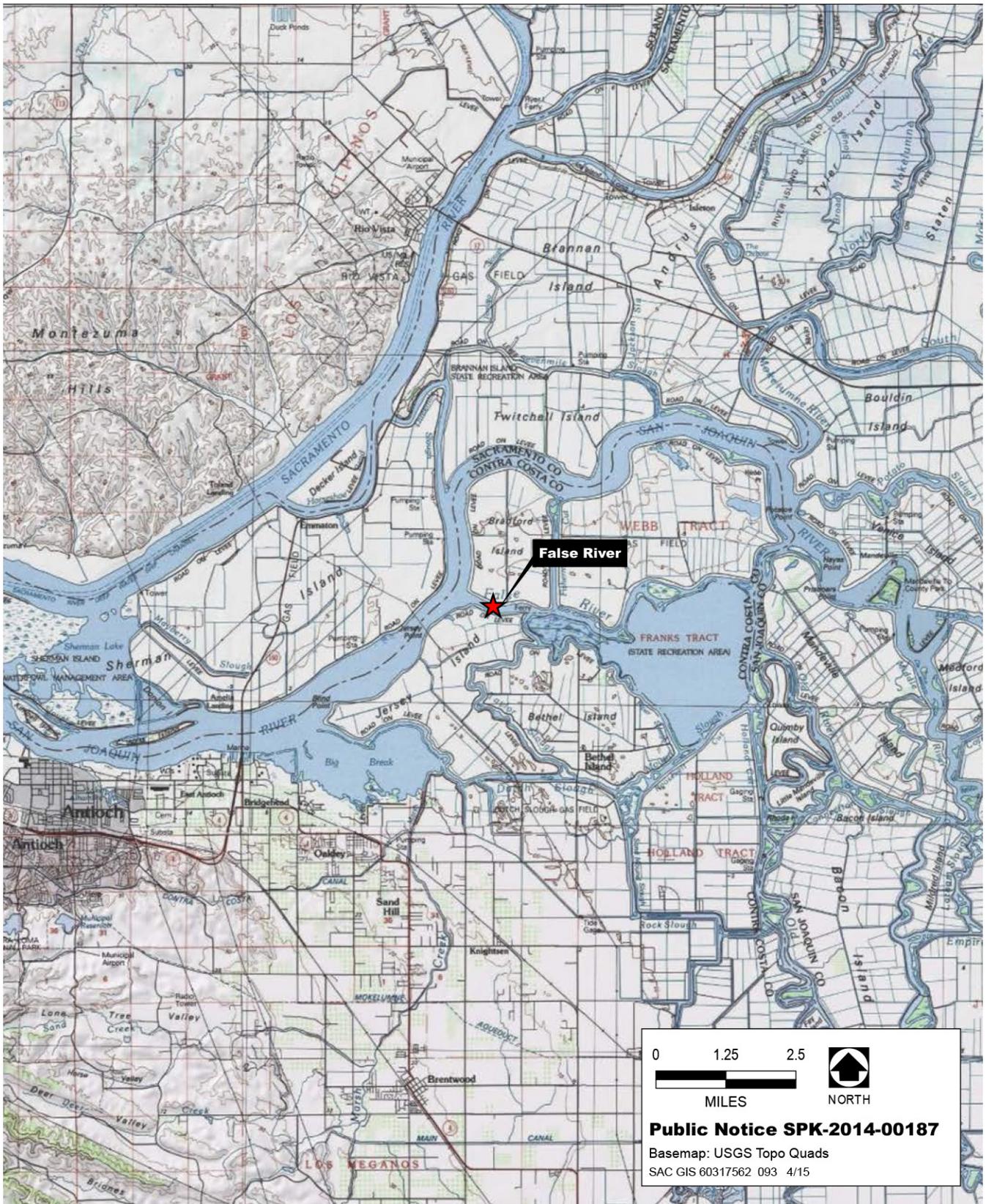
4 PROJECT DESCRIPTION

4.1 PROJECT LOCATION

The geologic drilling would occur at West False River (Figure 1 and Figure 2). The project site is located on West False River approximately 0.4 mile east of its confluence with the San Joaquin River, between Jersey and Bradford islands in Contra Costa County, and is about 4.8 miles northeast of Oakley.

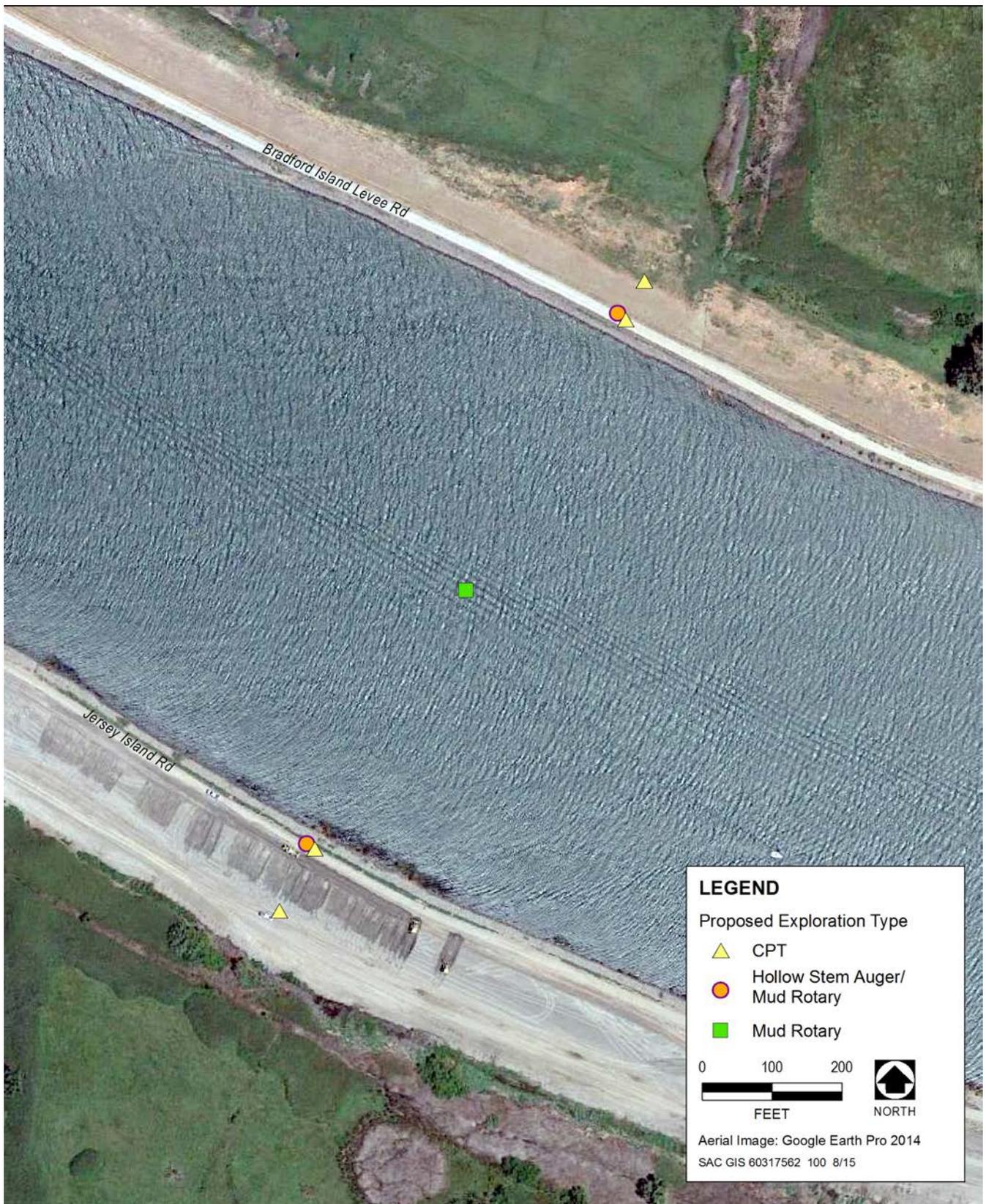
4.2 GEOLOGIC EXPLORATION ACTIVITY

A total of up to four cone penetrometer tests (CPTs), two drill holes, and one overwater drill hole would be completed (see Figure 2). Photographs of West False River are shown in Figure 3.



Source: Moffatt & Nichol 2014, AECOM 2014

Figure 1 Regional Location of West False River Salinity Barrier Geologic Exploration



Source: Moffatt & Nichol 2014, AECOM 2014

Figure 2 Aerial View of West False River Salinity Barrier Geologic Exploration Location



Figure 3

Project Site – West False River South Levee (top), North Levee (middle), and North Levee at USGS Gaging Station East of the Barrier Site (bottom).

4.2.1 CONE PENETROMETER TEST SOUNDINGS

A total of four CPT soundings would be conducted on the levee crown and levee toe on each side of the channel. The crown CPTs would be approximately 100 feet below ground surface, and the toe CPTs would be approximately 70 feet below ground surface. The CPT boreholes would be approximately 2 inches in diameter. A track-mounted CPT rig would be used. The CPT soundings are anticipated to be completed within approximately 2 working days. The CPT boreholes would be abandoned by backfilling to approximately 3 feet below ground surface with a cement/bentonite grout through a tremie pipe. The remaining 3 feet would be backfilled with soil cuttings.

4.2.2 LAND DRILL HOLES

A total of two hollow stem auger (HSA)/mud rotary drill holes would be drilled through the levee crown on each side of the channel, to a depth of approximately 100 feet. The drill holes would be advanced by a truck-mounted rotary drill rig, accompanied by a drill rig tender/tool truck. HSA boreholes would be approximately 8 inches in diameter and the mud rotary drill boreholes would be approximately 4 inches in diameter. The augers may be removed and replaced with casing or left in place to act as casing to protect the embankment during mud rotary drilling. In this case, the term “mud” refers to the use of bentonite clay added to the boring to allow removal of drill cuttings and to stabilize the drill hole.

Standard penetration tests with a 140-pound auto-hammer would be conducted a minimum of every 5 feet during drilling, and the cleanout interval would be continuously cored using a geo-barrel or equivalent continuous soil coring method. The sampler type used will be determined in the field based on the soil conditions encountered but will likely include Standard Penetration Tests, Modified California Samplers, and Shelby tubes. Wet drill cuttings and drilling fluid would be contained in drums, large containers, or vacuum truck and disposed of at an appropriate landfill. The two drill holes are anticipated to be completed in approximately 2-3 working days and to be abandoned using the same method described above for the CPT soundings.

4.2.3 OVERWATER EXPLORATION

One overwater geotechnical drill hole may be completed in the channel to a planned depth of approximately 80 feet below the mud line (river bottom). The drilling would be conducted with a rotary drilling rig mounted on a shallow-draft barge anchored into the bottom of the channel with two to four spuds (steel pipes). Personnel would access the barge via a support boat. When a drill rig remains on a boring location for more than 1 day, the drill apparatus and casing would remain in the water column and drill hole to minimize sediment disturbance of the river bottom.

The drill apparatus would consist of a 10-inch-diameter conductor casing that would extend from the barge deck, through the water column, and into the soft sediments of the river bottom. The casing would be smaller than most piers and would not impede water flow. All of the drilling rods, samplers, and other down-hole equipment would pass through the inside of the casing, which would separate them effectively from the water.

The drill hole would be advanced using mud rotary method and would be drilled and sampled to a maximum depth of approximately 80 feet below the mud line. Initially, the boring would be advanced by pushing the conductor casing to approximately 10 feet or more below the mud line. The conductor casing would be used to confine the drill fluid and cuttings within the drill hole and operating deck of the barge and prevent any

inadvertent spillage into the water. Soil samples would be collected from within the conductor casing using the same methods described above for the land drill holes.

The drill hole below the conductor casing would be approximately 3.5 inches in diameter. Only water would be circulated through the pumps and conductor casing when drilling and sampling within 15-20 feet of the mud line. For drilling deeper than 15-20 feet, the drilling fluid, consisting of a mixture of circulating water and bentonite clay, would be introduced into the conductor casing via the drill string to create a more viscous drilling fluid (drilling mud). The drilling fluid would pass down the center of the drill rod to the cutting face in the formation being drilled and would return up the drilled hole with the suspended cuttings. The drilling fluids and cuttings would be confined by the borehole walls and the conductor casing. Return drill fluids would pass through the conductor casing to the barge and then through a tee connection or similar device at the head of the conductor casing into the drilling fluid recirculation tank. DWR would develop and implement a Frac-Out Contingency Plan to avoid and minimize the release of drilling fluid into West False River.

The conductor casing and the recirculation tank would create a closed system at the top of the hole on the barge deck to contain the drill fluids. A heavy plastic sleeve would be placed over the conductor casing and would drape into an external mud tank to reduce drilling fluid leaks between the casing and the barge deck. This system would provide a reliable seal and prevent significant spillage of the drilling fluid into the water. The drill rod and sample rod connections would be disconnected either directly over the conductor casing or the recirculation tank. Furthermore, positive barriers consisting of straw wattles and/or other suitable types of spill-stoppage materials would be placed around the work area on the barge. Drill cuttings (sand) that settle out in the recirculation tank would be collected into 55-gallon storage drums. Good work practices would be observed and maintained in containing the drilling fluid, including taking care when transferring drill cuttings from the recirculation tank to the drums. The drums would be placed adjacent to the recirculation tank. If drilling fluid or drill cuttings material accidentally spill onto the barge deck outside of the containment area, they would be picked up immediately with a flat blade shovel and placed either into the recirculation tank or a storage drum, and the affected area would be cleaned. Discarded soil samples also would be placed in the storage drums and disposed of at an appropriate landfill.

An engineering geologist would be onsite at the drill rig to supervise activities at all times during the operation to ensure that all drilling fluid and cuttings are kept and confined within the recirculation tanks and storage drums. The engineering geologist would pay special attention to the river water for the presence of colored or increasingly opaque plumes when drilling, grouting, and pulling the conductor casing. Colored plumes are an indication that material may be leaking into the water. All personnel on the barge would report any observations of colored plumes in the water or leaking of the drilling fluids to the engineering geologist. If an unauthorized discharge is discovered by any of the personnel on board the barge, drilling activities would cease until appropriate corrective measures are completed. The overwater boring would be performed by a licensed drilling contractor under the direction of DWR or its contractor. The overwater drilling is anticipated to be completed in approximately 7 working days and to be abandoned using the same method described above for the CPT soundings.

4.3 SCHEDULE

Land-based geologic exploration may occur either (1) after USACE authorization but before November 15, 2015, or (2) May 1, 2016 through September 30, 2016. Overwater geologic exploration may occur either (1) after USACE authorization but before November 15, 2015, or (2) August 1, 2016 through November 15, 2016. Geologic exploration would occur for approximately 12 total working days. The CPT soundings are anticipated to be completed within approximately 2 working days. The two land drill holes are anticipated to be completed in approximately 2-3 working days. Overwater exploration would be conducted between August 1 and November 15 to minimize the potential for adverse effects on fish and other aquatic resources. The overwater drilling is anticipated to be completed in approximately 7 working days.

5 CONSERVATION MEASURES

DWR will implement five environmental commitments as part of the proposed action. These commitments will minimize potential environmental impacts from the proposed action.

1. CONDUCT A WORKER ENVIRONMENTAL AWARENESS PROGRAM

Geotechnical exploration workers will participate in a worker environmental awareness program that addresses species under jurisdiction of the regulatory agencies (California Department of Fish and Wildlife [CDFW], USFWS, and National Marine Fisheries Service). Workers will be informed about the potential presence of listed and other protected species, and habitats associated with such species, and that unlawful take of the species or destruction of their habitat is a violation of the federal and California Endangered Species Acts. Before the start of exploration activities, a qualified biologist will instruct all workers about the life histories of the protected species and the terms and conditions of applicable regulatory permits and authorizations that include biological resource protection measures.

2. CONDUCT BIOLOGICAL MONITORING

A qualified biologist will be onsite during land-based explorations. The biologist will be given the authority to stop work that may result in, or in the event that there is, take of listed species. If the biologist exercises this authority, the permitting agencies will be notified by telephone and electronic mail within 1 working day. A report of daily records from monitoring activities and observations will be prepared and provided to the regulatory agencies upon completion of exploration activities.

3. IMPLEMENT PROTOCOLS FOR GIANT GARTER SNAKE

The following protocols will be implemented in order to avoid and minimize potential impacts on giant garter snakes that may be present at or near the proposed exploration locations.

- ▶ Land-based exploration activities will occur during the giant garter snake active season (May 1–September 30), to the extent feasible.
- ▶ The land-based exploration locations will be surveyed for giant garter snakes by a qualified biologist immediately before equipment is moved into place.

- ▶ Through best management practices all attempts will be made to cause no harm or harassment of giant garter snake. If a giant garter snake is encountered at a land-based exploration location, activities will cease until appropriate corrective measures have been completed or it has been determined that the snake will not be harmed.
- ▶ The biologist will notify USFWS and CDFW immediately if a giant garter snake is found onsite, and will submit a report, including date(s), location(s), habitat description, and any corrective measures taken to protect the snake.

4. MINIMIZE WILDLIFE ATTRACTION

To eliminate attraction of wildlife to the area where geologic exploration would occur, all food-related trash items, such as wrappers, cans, bottles, and food scraps, will be disposed of in closed containers and removed from the site on a daily basis.

5. PREPARE AND IMPLEMENT A HAZARDOUS MATERIALS MANAGEMENT PROGRAM

A Hazardous Materials Management Program (HMMP) will be prepared and implemented to identify the hazardous materials to be used during geologic exploration; describe measures to prevent, control, and minimize the spillage of hazardous substances; describe transport, storage, and disposal procedures for these substances; and outline procedures to be followed in case of a spill of a hazardous material. The HMMP will require that hazardous and potentially hazardous substances stored onsite be kept in securely closed containers located away from drainage courses, storm drains, and areas where stormwater is allowed to infiltrate. It will also stipulate procedures to minimize hazard during onsite fueling and servicing of exploration equipment. Finally, the HMMP will require that adjacent land uses be notified immediately of any substantial spill or release.

6. FRAC-OUT CONTINGENCY PLAN

A Frac-Out Contingency Plan will be prepared and implemented to describe measures to prevent, control, and minimize the potential for a frac-out (inadvertent return of drilling lubricant) into West False River. The Plan will also provide for the timely detection of frac-outs; protect areas that are considered environmentally sensitive; ensure a minimum-impact response in the event of a frac-out; and ensure that all appropriate notifications are made to the appropriate regulatory agencies in 24 hours and that documentation is completed.

6 ACTION AREA

The action area is defined as all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action (50 CFR § 402.02). For the purposes of this biological assessment, the action area includes the specific geotechnical exploration locations shown in Figure 2 and a 200-foot buffer surrounding the locations to incorporate any suitable habitat for giant garter snake that could be adversely affected by the exploration activities. Appendix B includes photographs of the action area.

7 LIFE HISTORY

Giant garter snakes inhabit marshes, sloughs, ponds, small lakes, low gradient streams and other waterways and agricultural wetlands. They are inactive or greatly reduce their activities during the late fall and winter months, typically emerging from winter retreats in late March to early April and often remaining active through October. The timing of their annual activities is subject to varying seasonal weather conditions. Giant garter snakes feed on small fishes, tadpoles, and frogs (Hansen 1988). They breed in March and April, with females giving birth to live young from late July through early September (Hansen and Hansen 1990).

Suitable giant garter snake habitat is characterized by all of the features necessary to support permanent populations of the species, including: (1) adequate water during the snake's active season, (2) emergent herbaceous wetland vegetation for escape and foraging habitat, (3) grassy banks and openings in waterside vegetation for basking, and (4) higher elevation upland habitat for cover and refuge from flooding (USFWS 2012). Occupied aquatic habitats typically contain permanent or seasonal water, mud bottoms, and vegetated dirt banks (Hansen and Brode 1980).

The width of uplands used by giant garter snake varies considerably. Many summer basking and refuge areas used by this snake are immediately adjacent to canals and other aquatic habitats, and may even be located in the upper canal banks. While this species is strongly associated with aquatic habitats, individuals have been noted using burrows as far as 165 feet from marsh edges during the active season and retreats more than 820 feet from the edge of wetland habitats while overwintering (Wylie et al. 1997, USFWS 1999). Therefore, land within this further distance may be important for snake survival in some cases (Hansen 1988).

8 ENVIRONMENTAL BASELINE

The environmental baseline “includes the past and present impacts of all federal, state, or private actions and other human activities in the action area, the anticipated impacts of all proposed federal projects in the action area that have already undergone formal or early Section 7 consultation, and the impact of state or private actions which are contemporaneous with the consultation in process” (50 CFR §402.02).

8.1 STATUS OF THE SPECIES IN THE ACTION AREA

Information regarding the status of giant garter snake in the action area is based on observations made during reconnaissance-level and pre-construction field surveys conducted before installation of the EDB began, observations made during biological monitoring of barrier installation, California Natural Diversity Database (CNDDB) occurrence records, and information presented in the *Bay Delta Conservation Plan* (DWR 2013). Reconnaissance-level surveys were conducted on March 14, 2014 and April 14, 2015; pre-construction surveys were conducted on April 21 and 29 and May 4, 2015; and construction monitoring was conducted May 5 through June 17, 2015.

A large portion of the Delta has not been comprehensively surveyed for giant garter snake, primarily because the majority of land is privately owned. Historical and more recent focused surveys failed to confirm extant population clusters in the region (Hansen 1986; Patterson 2003, 2005; Patterson and Hansen 2004), including during DWR surveys of various Delta locations in 2009. However, individuals have been trapped at White Slough

Wildlife Area and several photographed near Little Connection Slough (USFWS 2012). More recent observations have been made at additional locations in the vicinity of Little Connection Slough and farther south in the Delta. These suggest viable populations of giant garter snake may persist in the eastern portion of the Delta.

Several observations of giant garter snake also have been documented in the vicinity of the project site in recent years. The CNDDDB includes three recent observations of giant garter snakes in the vicinity of the EDB site: a 2002 observation near the ferry dock at the southwestern corner of Webb Tract, approximately 1.5 miles east of the site; a 2010 observation on the south side of Sherman Island, approximately 5 miles southwest of the site; and a 2014 observation on the landside slope of the south levee of Webb Tract, approximately 2.5 miles east of the site. Two older occurrences are also documented in the CNDDDB, a 1998 observation approximately 3.5 miles northwest of the site and a pre-1986 specimen collected in the vicinity of the 2010 observation.

In 2003 and 2004, focused surveys for giant garter snake were conducted on the Webb Tract, but no individuals were documented. The surveyors concluded that though the island provided habitat and had the potential to support a giant garter snake population, such a population didn't appear to exist (USFWS 2006). The origin of giant garter snakes documented in the vicinity of the project site in recent years is uncertain, and observations in the central Delta have typically been considered to be of snakes that occasionally move into the region by 'washing-down' from known populations and that these occurrences do not represent local breeding populations (USFWS 2006; Hansen, pers. comm., in DWR 2013). As a result, Little Connection Slough has been thought to represent the most western Delta location where the species regularly exists (USFWS 2012). However, this assumption is being reconsidered, because the frequency of observations in the area has increased in recent years, potentially indicating a permanent population may be present, despite previous negative survey results.

The potential presence of a permanent population of giant garter snakes in the vicinity of the EDB site was further supported by observations made in April and May 2015, during activities associated with EDB installation. Confirmed observations of the species were made on 7 days between April 21 and May 21, and four unconfirmed observations were made during the same period. These include observations made on or immediately adjacent to the EDB site (on Jersey and Bradford islands), and while traveling between the Jersey Island ferry dock and the site.

8.2 FACTORS AFFECTING THE SPECIES AND HABITAT IN THE ACTION AREA

A number of factors have and continue to affect giant garter snake throughout its range. The primary cause of giant garter snake decline throughout its current and former ranges has been attributed to aquatic habitat loss. The most serious current threats to the species are loss and fragmentation of habitat from both urban and agricultural development and potential loss of habitat associated with changes in rice production (USFWS 2012). Activities such as water management and water transfers that result in habitat loss are also of particular concern. Secondary threats include introduced predators, road construction, and erosion control. Based on review of historic aerial photography, habitat in the action area has changed little in the past 20 years. However, if giant garter snakes are present in the area, they could suffer adverse effects from agricultural and pastoral activities, levee maintenance and repair, and vehicle mortality.

In addition to the current and potential future installation of the West False River EDB, only one other ongoing, recent, or planned future project known from within or nearby the action area for terrestrial species. In 2014, a seepage berm was constructed by the local Reclamation District as part of the Delta Levee Special Flood Control

Projects Program. The berm is landside of the Jersey Island levee and overlaps the EDB project site. In addition, the Reclamation District conducted geotechnical borings on and at the toe of the berm on May 14, 2015, during the EDB installation period.

9 EFFECTS ASSESSMENT

Figure 2 shows the locations where geotechnical exploration would occur. False River provides only marginally suitable aquatic habitat, because giant garter snakes are generally absent from large rivers. The river is likely used as a movement corridor between areas of suitable habitat on the islands, but drilling at the one potential in-river location is unlikely to directly affect the species. If individuals are present in the river during the brief period when exploration activities would occur, they should be able to easily leave and/or avoid the small area of disturbance.

Upland areas would be disturbed by movement of drill rigs and other equipment, but such disturbance would be limited to the crown of both levees and previously disturbed landside areas, including the recently constructed seepage berm and EDB staging area on Jersey Island. Because they have been recently graded and compacted, the levees and Jersey Island berm do not provide underground refuge for giant garter snake. The area where the CPT sounding would be taken at the toe of the Bradford Island levee has also been disturbed, but less recently. Therefore, this location has a limited potential to support underground refugia for giant garter snake. However, the potential for a giant garter snake to be within the profile of the exploration hole is very low. Therefore, implementation of land-based exploration is not likely to adversely affect snakes that may be underground when exploration activities occur.

Despite the disturbed nature of upland areas where geotechnical exploration would be conducted, observations made during EDB installation confirm that giant garter snakes occur in the area and could be encountered during exploration activities. Conservation measures described in Section 5 would be implemented to avoid potential for personnel, vehicles, and equipment to come in direct contact with snakes or otherwise result in harm or harassment. With implementation of these measures, it is unlikely take of giant garter snake would occur as a result of exploration activities.

10 CUMULATIVE EFFECTS

Under the federal ESA, cumulative effects are those effects of future state, tribal, local, or private actions that are reasonably certain to occur within the action area of the federal action subject to consultation (50 Code of Federal Regulations 402.2). Future federal actions that are unrelated to the proposed action are not considered in this assessment because they require separate consultation under Section 7 of the ESA.

The only known future projects that may be considered reasonably certain to occur in the action area for terrestrial species are removal of the EDB in September-November 2015 and potential installation and removal of a salinity barrier in a future year. However, these actions would be subject to USACE authorization and would therefore require Section 7 consultation. Additional Reclamation District activities may be under consideration but are not known at this time, and routine agricultural activities and other private landowner actions are likely to be ongoing

in the action area. All of these potential future activities could alter habitat for and/or increase incidental take of giant garter snake and would be cumulative to the effects of the geotechnical exploration.

11 CONCLUSION

Based on observations made during EDB installation, giant garter snake is known to occur in the area where geotechnical exploration would be implemented. However, the area and duration of disturbance for land-based exploration would be very limited. With implementation of conservation measures described in Section 5, giant garter snake is not likely to be adversely affected by exploration activities. Therefore, implementing the proposed geotechnical exploration would not jeopardize the continued existence of giant garter snake.

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APPENDIX A

USFWS Species List for the
West False River Emergency Salinity Barrier Project

U.S. Fish & Wildlife Service
Sacramento Fish & Wildlife Office
Federal Endangered and Threatened Species that Occur in
or may be Affected by Projects in the Counties and/or
U.S.G.S. 7 1/2 Minute Quads you requested

Document Number: 150409030031

Current as of: April 9, 2015

Quad Lists

Listed Species

Invertebrates

- Apodemia mormo langei*
Lange's metalmark butterfly (E)
- Branchinecta conservatio*
Conservancy fairy shrimp (E)
- Branchinecta longiantenna*
longhorn fairy shrimp (E)
- Branchinecta lynchi*
Critical habitat, vernal pool fairy shrimp (X)
vernal pool fairy shrimp (T)
- Desmocerus californicus dimorphus*
valley elderberry longhorn beetle (T)
- Elaphrus viridis*
delta green ground beetle (T)
- Incisalia mossii bayensis*
San Bruno elfin butterfly (E)
- Lepidurus packardi*
vernal pool tadpole shrimp (E)

Fish

- Acipenser medirostris*
green sturgeon (T) (NMFS)
- Hypomesus transpacificus*
Critical habitat, delta smelt (X)
delta smelt (T)
- Oncorhynchus mykiss*
Central Valley steelhead (T) (NMFS)
Critical habitat, Central Valley steelhead (X) (NMFS)
- Oncorhynchus tshawytscha*
Central Valley spring-run chinook salmon (T) (NMFS)
Critical Habitat, Central Valley spring-run chinook (X) (NMFS)
Critical habitat, winter-run chinook salmon (X) (NMFS)
winter-run chinook salmon, Sacramento River (E) (NMFS)

Amphibians

- Ambystoma californiense*
California tiger salamander, central population (T)
Critical habitat, CA tiger salamander, central population (X)
- Rana draytonii*
California red-legged frog (T)

Reptiles

- Masticophis lateralis euryxanthus*

Alameda whipsnake [=striped racer] (T)
Critical habitat, Alameda whipsnake (X)

Thamnophis gigas

giant garter snake (T)

Birds

Rallus longirostris obsoletus

California clapper rail (E)

***Sternula antillarum* (=Sterna, =albifrons) browni**

California least tern (E)

Mammals

Reithrodontomys raviventris

salt marsh harvest mouse (E)

Vulpes macrotis mutica

San Joaquin kit fox (E)

Plants

Amsinckia grandiflora

large-flowered fiddleneck (E)

Cordylanthus mollis* ssp. *mollis

soft bird's-beak (E)

Erysimum capitatum* ssp. *angustatum

Contra Costa wallflower (E)

Critical Habitat, Contra Costa wallflower (X)

Lasthenia conjugens

Contra Costa goldfields (E)

Neostapfia colusana

Colusa grass (T)

Oenothera deltoides* ssp. *howellii

Antioch Dunes evening-primrose (E)

Critical habitat, Antioch Dunes evening-primrose (X)

Sidalcea keckii

Keck's checker-mallow (=checkerbloom) (E)

Quads Containing Listed, Proposed or Candidate Species:

WOODWARD ISLAND (463A)

BRENTWOOD (463B)

ANTIOCH SOUTH (464A)

ISLETON (480A)

RIO VISTA (480B)

JERSEY ISLAND (480C)

BOULDIN ISLAND (480D)

BIRDS LANDING (481A)

ANTIOCH NORTH (481D)

County Lists

Contra Costa County

Listed Species

Invertebrates

Apodemia mormo langei

Lange's metalmark butterfly (E)

Branchinecta conservatio

Conservancy fairy shrimp (E)

Branchinecta longiantenna

Critical habitat, longhorn fairy shrimp (X)
longhorn fairy shrimp (E)

Branchinecta lynchi

Critical habitat, vernal pool fairy shrimp (X)
vernal pool fairy shrimp (T)

Desmocerus californicus dimorphus

valley elderberry longhorn beetle (T)

Elaphrus viridis

delta green ground beetle (T)

Incisalia mossii bayensis

San Bruno elfin butterfly (E)

Lepidurus packardii

vernal pool tadpole shrimp (E)

Speyeria callippe callippe

callippe silverspot butterfly (E)

Syncaris pacifica

California freshwater shrimp (E)

Fish

Acipenser medirostris

green sturgeon (T) (NMFS)

Eucyclogobius newberryi

tidewater goby (E)

Hypomesus transpacificus

Critical habitat, delta smelt (X)
delta smelt (T)

Oncorhynchus kisutch

coho salmon - central CA coast (E) (NMFS)
Critical habitat, coho salmon - central CA coast (X) (NMFS)

Oncorhynchus mykiss

Central California Coastal steelhead (T) (NMFS)
Central Valley steelhead (T) (NMFS)
Critical habitat, Central California coastal steelhead (X) (NMFS)
Critical habitat, Central Valley steelhead (X) (NMFS)

Oncorhynchus tshawytscha

Central Valley spring-run chinook salmon (T) (NMFS)
Critical Habitat, Central Valley spring-run chinook (X) (NMFS)
Critical habitat, winter-run chinook salmon (X) (NMFS)
winter-run chinook salmon, Sacramento River (E) (NMFS)

Amphibians

Ambystoma californiense

California tiger salamander, central population (T)
Critical habitat, CA tiger salamander, central population (X)

Rana draytonii

California red-legged frog (T)
Critical habitat, California red-legged frog (X)

Reptiles

Masticophis lateralis euryxanthus

Alameda whipsnake [=striped racer] (T)
Critical habitat, Alameda whipsnake (X)

Thamnophis gigas

giant garter snake (T)

Birds

Charadrius alexandrinus nivosus

western snowy plover (T)

Coccyzus americanus occidentalis

Western yellow-billed cuckoo (T)

Pelecanus occidentalis californicus

California brown pelican (E)

Rallus longirostris obsoletus

California clapper rail (E)

Sternula antillarum (=Sterna, =albifrons) browni

California least tern (E)

Strix occidentalis caurina

northern spotted owl (T)

Mammals

Reithrodontomys raviventris

salt marsh harvest mouse (E)

Vulpes macrotis mutica

San Joaquin kit fox (E)

Plants

Amsinckia grandiflora

large-flowered fiddleneck (E)

Arctostaphylos pallida

pallid manzanita (=Alameda or Oakland Hills manzanita) (T)

- Calochortus tiburonensis*
Tiburon mariposa lily (T)
- Castilleja affinis ssp. neglecta*
Tiburon paintbrush (E)
- Chorizanthe robusta var. robusta*
robust spineflower (E)
- Clarkia franciscana*
Presidio clarkia (E)
- Cordylanthus mollis ssp. mollis*
soft bird's-beak (E)
- Cordylanthus palmatus*
palmate-bracted bird's-beak (E)
- Erysimum capitatum ssp. angustatum*
Contra Costa wallflower (E)
Critical Habitat, Contra Costa wallflower (X)
- Hesperolinon congestum*
Marin dwarf-flax (=western flax) (T)
- Holocarpha macradenia*
Critical habitat, Santa Cruz tarplant (X)
Santa Cruz tarplant (T)
- Lasthenia conjugens*
Contra Costa goldfields (E)
Critical habitat, Contra Costa goldfields (X)
- Neostapfia colusana*
Colusa grass (T)
- Oenothera deltoides ssp. howellii*
Antioch Dunes evening-primrose (E)
Critical habitat, Antioch Dunes evening-primrose (X)
- Pentachaeta bellidiflora*
white-rayed pentachaeta (E)
- Sidalcea keckii*
Keck's checker-mallow (=checkerbloom) (E)
- Streptanthus niger*
Tiburon jewelflower (E)
- Suaeda californica*
California sea blite (E)

Trifolium amoenum

showy Indian clover (E)

Proposed Species

Plants

Cordylanthus mollis ssp. mollis

Critical habitat, soft bird's-beak (PX)

Key:(E) *Endangered* - Listed as being in danger of extinction.(T) *Threatened* - Listed as likely to become endangered within the foreseeable future.(P) *Proposed* - Officially proposed in the Federal Register for listing as endangered or threatened.(NMFS) Species under the Jurisdiction of the [National Oceanic & Atmospheric Administration Fisheries Service](#). Consult with them directly about these species.*Critical Habitat* - Area essential to the conservation of a species.(PX) *Proposed Critical Habitat* - The species is already listed. Critical habitat is being proposed for it.(C) *Candidate* - Candidate to become a proposed species.

(V) Vacated by a court order. Not currently in effect. Being reviewed by the Service.

(X) *Critical Habitat* designated for this species

Important Information About Your Species List

How We Make Species Lists

We store information about endangered and threatened species lists by U.S. Geological Survey 7½ minute quads. The United States is divided into these quads, which are about the size of San Francisco.

The animals on your species list are ones that occur within, **or may be affected by** projects within, the quads covered by the list.

- Fish and other aquatic species appear on your list if they are in the same watershed as your quad or if water use in your quad might affect them.
- Amphibians will be on the list for a quad or county if pesticides applied in that area may be carried to their habitat by air currents.
- Birds are shown regardless of whether they are resident or migratory. Relevant birds on the county list should be considered regardless of whether they appear on a quad list.

Plants

Any plants on your list are ones that have actually been observed in the area covered by the list. Plants may exist in an area without ever having been detected there. You can find out what's in the surrounding quads through the California Native Plant Society's online [Inventory of Rare and Endangered Plants](#).

Surveying

Some of the species on your list may not be affected by your project. A trained biologist and/or botanist, familiar with the habitat requirements of the species on your list, should determine whether they or habitats suitable for them may be affected by your project. We recommend that your surveys include any proposed and candidate species on your list. See our [Protocol](#) and [Recovery Permits](#) pages.

For plant surveys, we recommend using the [Guidelines for Conducting and Reporting Botanical Inventories](#). The results of your surveys should be published in any environmental documents prepared for your project.

Your Responsibilities Under the Endangered Species Act

All animals identified as listed above are fully protected under the Endangered Species Act of 1973, as amended. Section 9 of the Act and its implementing regulations prohibit the take of a federally listed wildlife species. Take is defined by the Act as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect" any such animal.

Take may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or shelter (50 CFR §17.3).

Take incidental to an otherwise lawful activity may be authorized by one of two procedures:

- If a Federal agency is involved with the permitting, funding, or carrying out of a project that may result in take, then that agency must engage in a formal [consultation](#) with the Service.

During formal consultation, the Federal agency, the applicant and the Service work together to avoid or minimize the impact on listed species and their habitat. Such consultation would result in a biological opinion by the Service addressing the anticipated effect of the project on listed and proposed species. The opinion may authorize a limited level of incidental take.

- If no Federal agency is involved with the project, and federally listed species may be taken as part of the project, then you, the applicant, should apply for an incidental take permit. The Service may issue such a permit if you submit a satisfactory conservation plan for the species that would be affected by your project.

Should your survey determine that federally listed or proposed species occur in the area and are likely to be affected by the project, we recommend that you work with this office and the California Department of Fish and Game to develop a plan that minimizes the project's direct and indirect impacts to listed species and compensates for project-related loss of habitat. You should include the plan in any environmental documents you file.

Critical Habitat

When a species is listed as endangered or threatened, areas of habitat considered essential to its conservation may be designated as critical habitat. These areas may require special management considerations or protection. They provide needed space for growth and normal behavior; food, water, air, light, other nutritional or physiological requirements; cover or shelter; and sites for breeding, reproduction, rearing of offspring, germination or seed dispersal.

Although critical habitat may be designated on private or State lands, activities on these lands are not restricted unless there is Federal involvement in the activities or direct harm to listed wildlife.

If any species has proposed or designated critical habitat within a quad, there will be a separate line for this on the species list. Boundary descriptions of the critical habitat may be found in the Federal Register. The information is also reprinted in the Code of Federal Regulations (50 CFR 17.95). See our [Map Room](#) page.

Candidate Species

We recommend that you address impacts to candidate species. We put plants and animals on our candidate list when we have enough scientific information to eventually propose them for listing as threatened or endangered. By considering these species early in your planning process you may be able to avoid the problems that could develop if one of these candidates was listed before the end of your project.

Species of Concern

The Sacramento Fish & Wildlife Office no longer maintains a list of species of concern. However, various other agencies and organizations maintain lists of at-risk species. These

lists provide essential information for land management planning and conservation efforts.
[More info](#)

Wetlands

If your project will impact wetlands, riparian habitat, or other jurisdictional waters as defined by section 404 of the Clean Water Act and/or section 10 of the Rivers and Harbors Act, you will need to obtain a permit from the U.S. Army Corps of Engineers. Impacts to wetland habitats require site specific mitigation and monitoring. For questions regarding wetlands, please contact Mark Littlefield of this office at (916) 414-6520.

Updates

Our database is constantly updated as species are proposed, listed and delisted. If you address proposed and candidate species in your planning, this should not be a problem. However, we recommend that you get an updated list every 90 days. That would be July 08, 2015.

APPENDIX B

Photographs of the Action Area



Photo 1: Looking west along the Jersey Island levee crown (April 14, 2015).



Photo 2: Looking west at regraded staging area on Jersey Island (June 25, 2015).

Appendix B Photographs of the Action Area



Photo 3: Looking west along the Bradford Island levee crown (April 14, 2015).



Photo 4: Looking northwest at landside levee toe on Bradford Island (April 14, 2015).

Appendix B Photographs of the Action Area



Photo 5: Looking south from Bradford Island at the Emergency Drought Barrier Project (June 17, 2015).

Appendix B Photographs of the Action Area